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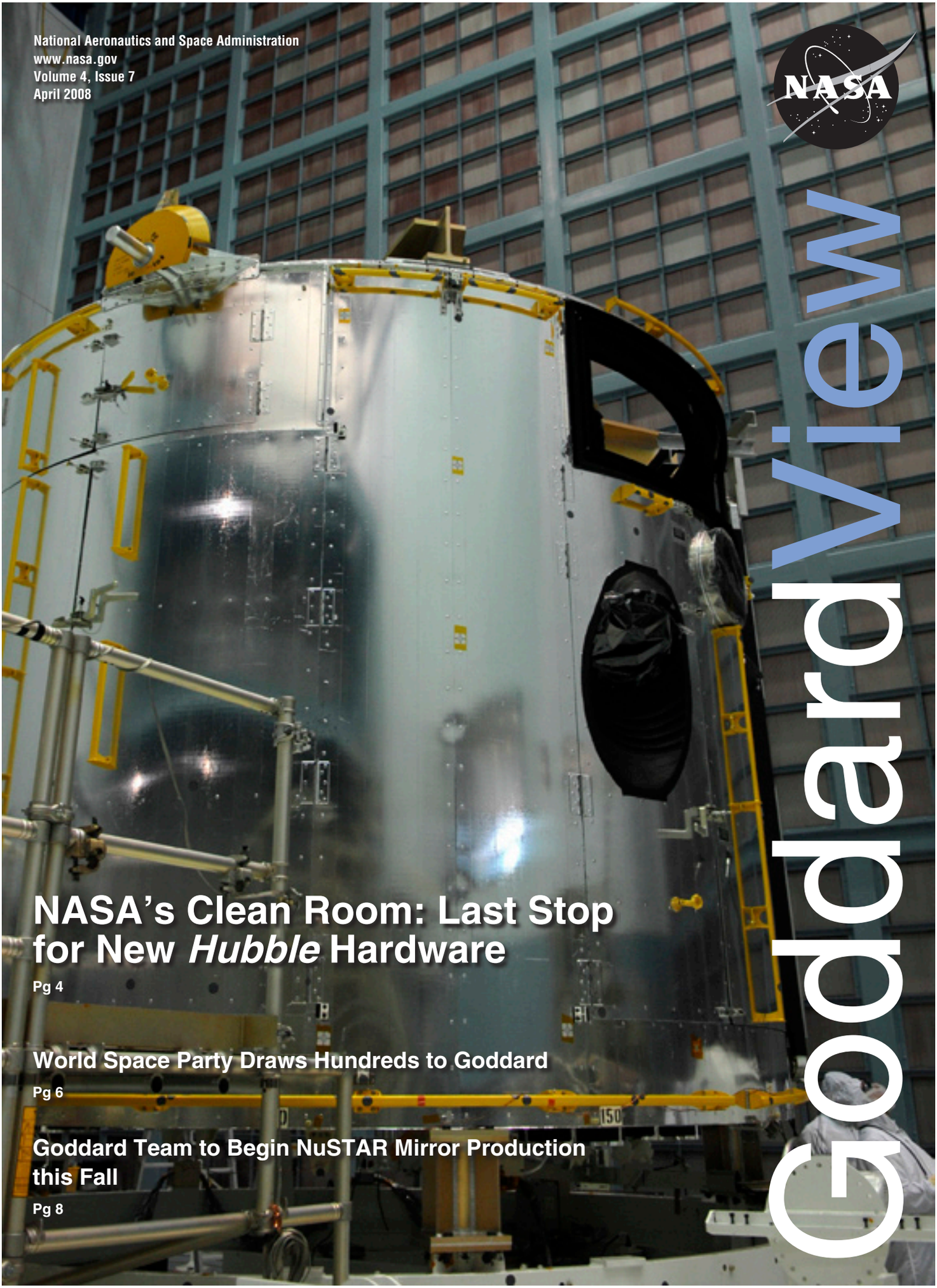

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Construction Update #4 on New Science Building

By Rob Gutro

This is the fourth in a recurring series of articles chronicling the construction of Goddard's Exploration Sciences Building (ESB).

Photo Credit: Debora McCallum

Caption: The three levels of the building are taking shape.

Photo Credit: Debora McCallum

Caption: Duct work is being installed in the first floor of the building.

For more information about NASA's Green Building, please visit the Web site: http://www.nasa.gov/centers/goddard/news/green_building.html. ■

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Cover caption: The High Fidelity Mechanical Simulator (HFMS) is shown in front of a wall of High Efficiency Particulate Air (HEPA) filters in the World's largest Class 10,000 clean room at the Goddard Space Flight Center.

Photo Credit: Chris Gunn

GoddardView Info

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Managing Editor: Trusilla Steele
Editor: John Putman

Deadlines: News items and brief announcements for publication in the Goddard View must be received by noon of the 1st and 3rd Wednesday of the month. You may submit contributions to the editor via e-mail at john.m.putman@nasa.gov. Ideas for new stories are welcome but will be published as space allows. All submissions are subject to editing.

Future Planning Core Team Launches Goddard Future on May 6

By John Putman

Kris Brown is the Special Assistant for Strategy and Development. For the past several months, she has served as the chief architect in developing a blueprint for Goddard's future. We talked to her about the future of Goddard.

What is the Future Planning Process?

We are in the midst of an exciting and unprecedented year at Goddard with the anticipated *Hubble Space Telescope* Servicing Mission 4, and launches of the Coupled Ion Neutral Dynamic Investigation (CINDI), the *Gamma-ray Large Area Space Telescope* (GLAST), the *Geostationary Operational Environmental Satellite-O* (GOES-O), the *Interstellar Boundary Explorer* (IBEX), the *Lunar Reconnaissance Orbiter* (LRO), and the *Solar Dynamics Observatory* (SDO). As we approach Goddard's fiftieth anniversary, it is appropriate for the Center to look toward the next 50 years. Goddard's senior leadership initiated a comprehensive future planning process to position our Center to better serve NASA in fulfilling its mission and overall program.

With insights gained from conducting a current state assessment, in which we touched over 400 employees in one-on-one and group interviews, we identified our key strengths and challenges. We then convened the Future Planning Core Team, a group that represents a broad spectrum of the Goddard community. Early in the process, Dr. Weiler held a series of town hall meetings to begin the dialogue about our future. The team conducted an inclusive process, engaging many members of our workforce to collectively envision a brilliant future for Goddard.

The process yielded a five-year plan entitled, "A Blueprint for the Future," which will strengthen Goddard's role in providing invaluable knowledge and contributions to our Nation and the world. This blueprint will be the foundation for an ongoing annual planning cycle, in which we will hold ourselves accountable for measurable progress toward our strategic goals.

Who is on the Future Planning Core Team?

The Core Team, convened beginning in late July, is composed of directorate representatives and at-large members, representing the many facets of Goddard. The team allocated many hours of their time and energy to this effort. These individuals bring expertise from many disciplines including science, engineering, technology, business, administrative, management, facilities, legal, and human capital, and represent all levels within the organization. The team has done a tremendous job in reaching out to others throughout the process, conducting focus groups with employees, interacting with senior management, and in communicating with various groups and constituencies across the Center.

Photo credit: Pat Izzo

Caption: The Future Focus Core Team.

Who supports the future planning effort at GSFC?

This effort began with Ed Weiler in his recognition that, in the midst of our exciting work, the Center will continue to face challenges. His senior staff and members of the Executive Council have been engaged in the process from the beginning, providing invaluable input throughout the process. The core team reached hundreds of people across the Center throughout the process, so ultimately, the plan contains contributions from the Goddard community. In Ed Weiler's absence, the support and vision of our Executive Council continues under Rick Obenschain's leadership, with the support of Laurie Leshin.

What can members of the Goddard community expect from May's kick-off?

We are finalizing plans to celebrate Goddard and to launch our future the week of May 5. We will hold directorate forums throughout that week along with several other events. Tuesday, May 6 is our kickoff day and will be a Goddard Spirit Day. All employees are invited to show their Goddard spirit by wearing mission, Goddard, and/or NASA attire. That day will include the start of the series of directorate forums, a cyber café in the library with talks by speakers representing the many faces of Goddard, a BBQ, and opportunities for employees to share their reflections and ideas.

What are the expected results from the Future Planning effort?

We are already committed to, and moving out on, a number of changes for the Center. These actions involve strengthening our community, improving our work environment, fostering innovation, facilitating effective communications, and providing more opportunities for Goddard to be in the public eye. Over the next five years, the changes outlined in this plan will bring clarity of purpose, greater cohesion and effectiveness, streamlined operations, sustained competitiveness, business agility, and a fully-engaged, world-class workforce.

Goddard provides the world vital knowledge about our own planet and its place in the universe. Over the past several months, I have had the privilege to meet and get to know many people here at Goddard. We are all moving so fast that we don't pause and realize how incredible it is to be here and to contribute to this institution and our Agency. We make discoveries that will change the world. We have a unique ability to inspire others, including the next generation. Given what our core team has learned these past months, we hold a sense of urgency about what Goddard can contribute to our Nation and the world. Given the unprecedented year ahead for Goddard, we are at a unique point in time to celebrate our achievements, support one another in accomplishing each mission and successful launches, and to work toward a brilliant future. We should all be extremely proud to be members of this remarkable community and excited about launching our future! ■

NASA's Clean Room: Last Stop for New *Hubble* Hardware

By Robert Garner

Astronauts will travel to the *Hubble Space Telescope* this summer to install new instruments and other components during Servicing Mission 4 (SM4). Before these components are cleared for launch, however, they must go through one final checkup in the world's largest clean room at NASA's Goddard Space Flight Center in Greenbelt, Md.

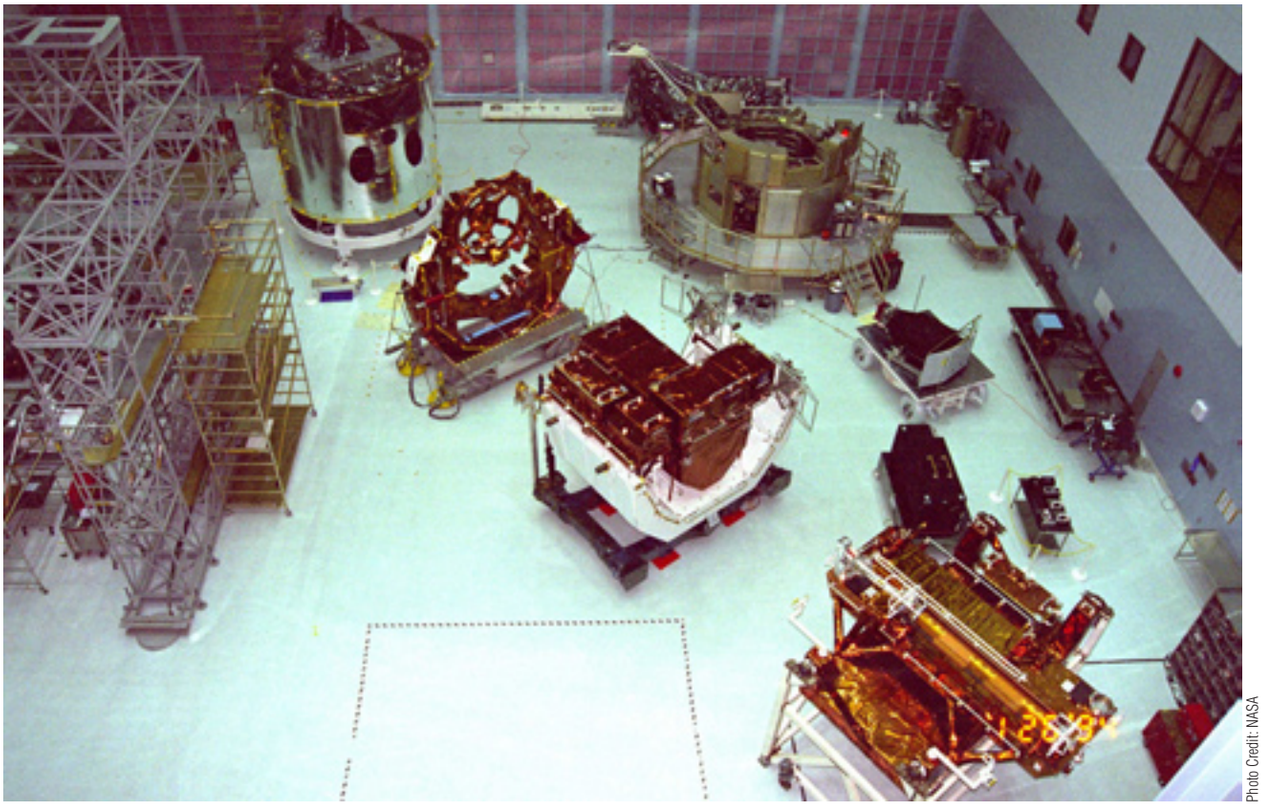

Photo Credit: NASA

Caption: Carriers, used to transport Hubble *instruments, wait in the largest clean room in the world at Goddard Space Flight Center. Astronauts also train in the room for servicing missions.*

"The High Bay Clean Room is to *Hubble* what hospital operating rooms are to patients," says Mike Weiss, *Hubble*'s Technical Deputy Program Manager at Goddard. "Surgeons wear sterile gowns, gloves, and masks during surgery, and operating rooms must be kept free of germs to keep patients healthy. In our case, *Hubble* is the patient."

Before entering the clean room, workers pass through a series of vestibules, all responsible for keeping the clean room free of contaminants. In the first vestibule, walking across the floor feels like walking inside a movie theater. The sticky texture doesn't come from spilled soda. Adhesive floor mats trap loose dirt from employees' shoes.

The next stop is a small glass room slightly larger than a phone booth, where workers receive a forced-air shower. Dozens of air jets on the walls blow away loose debris from hair, skin, and clothing. A green light indicates when it is safe to enter the last station, a larger area with lockers and benches. It is in this area where anyone intending to enter the clean room must don sterile bodysuits, head covers, gloves, boots, and face masks. It's a painstaking process that can take between 10 and 15 minutes.

Significance of the Clean room

The clean room and the elaborate steps taken before entering it are vital to the success of every *Hubble* mission. Even a speck of dust or a fingerprint could severely damage the sensitive telescope components and instruments, so the clean room must filter out these harmful contaminants. Unlike personal digital cameras, a smudge or speck of dust on *Hubble*'s optics and sensors can't be easily cleaned, especially once the instruments have reached orbit.

Besides being extremely clean, this facility is also the only place large enough to house *Hubble*'s components and simulators, as well as all the equipment needed to prepare the components for launch. In fact, the Goddard clean room is big enough to house two Space Shuttle payloads at the same time.

Because of its size and sanitary conditions, Weiss says all the components taken to *Hubble* on the four previous servicing missions (SM1, SM2, SM3A, and SM3B) made their way through Goddard's clean room.

Two Types of Contaminants

The entryway vestibules and suit-up process help counteract particulate debris, one of two contaminating offenders. Particulate debris includes tiny

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NASA's Clean Room: Last Stop for New *Hubble* Hardware

Continued from Page 4

bits of dirt or dust workers might track in, such as loose fabric lint or flakes of dead skin. A robust ventilation system and an entire wall of air filters provide further protection.

The clean room ventilation system circulates almost one million cubic feet of air every minute through 9,000 square feet of HEPA filters located along one wall. The filters are not your typical off-the-shelf HEPA variety from the local home improvement store. These are specially designed to last several decades.

Combined, all these features afford the Goddard clean room a Class 10,000 rating. This means that any cubic foot of air in the clean room contains no more than 10,000 particles floating around in it that are larger than 0.5 microns. A micron is one-millionth of a meter. A human hair is between 20 and 200 microns wide. Typical "outside" air has millions of such particles.

Molecular contaminants, the second offender, are a little more difficult to describe. Most people are familiar with "new car smell." Over time that smell fades away because molecules in the car's plastics and leather vaporize, or "boil off." Exposure to the heat of a summer day speeds up the process.

The optics and sensors inside *Hubble* and other spacecraft go through a similar process. Orbiting Earth every 97 minutes, *Hubble* passes through the intense heat of the Sun a whopping 15 times a day. Those higher temperatures can cause materials inside *Hubble* to boil-off molecules.

The loss of some molecules poses no threat to a car, but this kind of molecular damage can devastate sensitive optical equipment. To prevent this, all of *Hubble*'s new components and instruments are put into a vacuum chamber and literally baked at high temperatures. This process eliminates potentially damaging molecules in one fell swoop, so they do not cause problems after the components are installed on *Hubble*.

Prelaunch Testing

Because the Goddard clean room does such an excellent job of filtering out contaminants, it is the perfect place to assemble and test *Hubble*'s components. Technicians spend hours running system compatibility tests to make sure all of the telescope's new instrument electronics and software will work correctly, a key step in preflight preparations. *Hubble*'s new instruments are connected to an exact duplicate, or simulator, of *Hubble*'s electrical system, called the Vehicle Electrical System Test (VEST) facility.

Instruments also go through a mechanical test to ensure components will fit and operate properly once they are installed in the telescope. Engineers mount the instruments inside an exact mechanical replica of the telescope's optical end, the High Fidelity Mechanical Simulator, which was built from the same blueprints as *Hubble*. Using this simulator, astronauts have the opportunity to see how hardware will look once installed on *Hubble*.

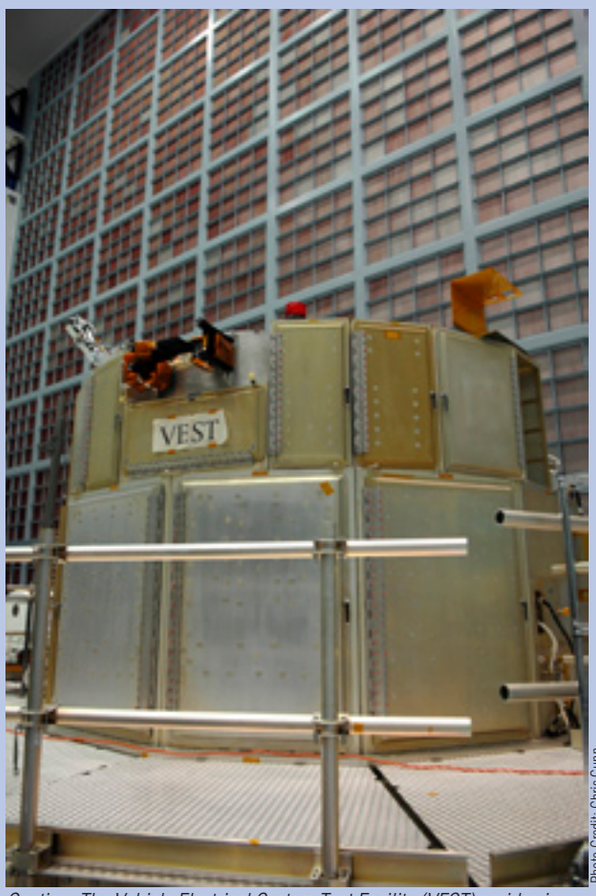

Photo Credit: Chris Gunn

Caption: The Vehicle Electrical System Test Facility (VEST) resides in Goddard's cleanroom.

The clean room also contains a structure called the Flight Support System (FSS). When reconfigured for the *Hubble* mission, the FSS will provide structural, mechanical, and electrical interfaces between *Hubble* and the Space Shuttle. The FSS serves as a maintenance platform, holding *Hubble* securely in place as astronauts work on the telescope. After servicing is complete, the support system enables astronauts to safely return *Hubble* to its orbit.

Only after all ground testing is completed and fit checks are performed will *Hubble*'s new instruments and components be carefully packed for shipment to NASA's Kennedy Space Center in Florida. Next stop: the *Hubble Space Telescope*! ■

World Space Party Draws Hundreds to Goddard

By Amy Pruett

To celebrate the anniversary of mankind's first foray into space and the first Space Shuttle flight, NASA's Goddard Space Flight Center teamed with the Space Generation Advisory Council to host a world space party on April 12.

The event commemorated major milestones in space history, and the current and future accomplishments of NASA. Cosmonaut Yuri Gagarin became the first person in space on April 12, 1961. Exactly 20 years later, NASA launched Space Shuttle *Columbia* on mission STS-1.

The party at Goddard was a Yuri's Night celebration, 1 of 198 in 51 countries, on 7 continents. Throughout the evening, more than 750 patrons joined the celebration at the Goddard Visitor Center between 7 p.m. and 1 a.m.

Dr. Laurie Leshin, Goddard's Deputy Director of Science and Technology, kicked off the celebration with a presentation on Goddard using the *Science on a Sphere* exhibit. Live music from the eclectic local band, The Cassettes, and beats infused by DJ Scientific—a.k.a. Mark Branch, a NASA aerospace engineer by day, and a premier hip hop disc jockey by night—kept the party energized all night long.

Photo Credit: Bill Hrybyk

Photo Credit: Bill Hrybyk

Caption: The Cassettes and DJ Scientific.

"I wasn't sure what to expect of Yuri's Night," said Rivers Lamb, a flight dynamics engineer in Goddard's Flight Dynamics Analysis Branch. "Working at NASA, I knew I'd have fun at the party, but I did wonder what my friends who aren't associated with NASA would think. It turned out to be a good ole party. The DJ was amazing, the band interesting, and Laurie's presentation was educational. It was a great event."

Attendees mixed and mingled throughout the Visitor Center, checking out the latest exhibits, as well as the grounds. Daring patrons took to the air in the moon bounce, while others got their groove on in the outdoor tent lit with professional club lighting.

"I am elated to have been a participant in this celebration of galactic exploration," said Nancy McBee, customer service representative for the Technical Information and Management Services (TIMS) branch. "The speakers were very informative and the presentations fascinating, as the audience experienced enlightening glimpses of *Science on the Sphere*. The atmosphere was very high-spirited and delightful."

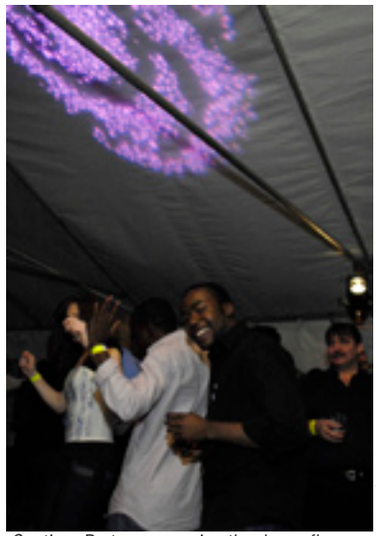

Photo Credit: Bill Hrybyk

Caption: Party goers enjoy the dance floor.

Other NASA Centers hosting Yuri's Night celebrations this year were Ames Research Center, Johnson Space Center, and Marshall Space Flight Center. The first Yuri's Night celebration was in 2001, with 79 events taking place in 29 countries.

The evening portion of Yuri's Night Goddard followed an afternoon of family-friendly, hands-on activities highlighting amazing space observations of our home planet.

The Space Generation Advisory Council is a network of young people committed to using space to make a difference in the world. Founded in 1999, this nonprofit organization is a vast global community of leaders who are passionate about space. Space Generation's compelling projects, such as Yuri's Night, engage the public in the role of space in the sustainability of the planet, and in exploring space responsibly. Their mission also includes attracting new people to their network of active space explorers.

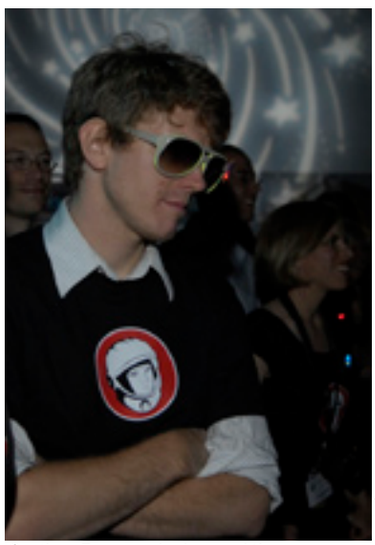

Photo Credit: Bill Hrybyk

Caption: Everyone had a good time.

Companies that supported Yuri's Night Goddard included Orbital Sciences Corporation, Analytical Graphics, Inc., SGT, Inc., Miller Brewing Company, The Tauri Group, Lockheed Martin Corporation, and Honeywell Technology Solutions, Inc. ■

"Goddard Career Firsts" Panel Showcases Women's Career Experiences

By Lynne Slater

In 1987, thanks to a remarkable collaboration between U.S. Senators Barbara Mikulski and Orrin Hatch, Congress proclaimed March as Women's History Month, "Because the role of American women in history has been consistently overlooked and undervalued in the literature, teaching, and study of American history." Despite the advances women have made in the intervening years, the same can be said for women in science, math, engineering, and other technical fields.

Goddard's Women's History Month program provided activities to celebrate the history of women at Goddard, discuss the social dynamics that contribute to the undervaluing of women's contributions, and offer skill development for both coping in the current environment and for changing it. The program's activities were sponsored by the Women's Advisory Committee (WAC), in partnership with the Special Assistants to the Director for Diversity and the Alternative Dispute Resolution (ADR) program.

On March 25, to celebrate women's history, a panel called "Goddard Career Firsts" showcased the career experiences of women who paved the way in their career fields. The panel members were Associate Director Nancy Abell; Director of the Information Technology and Communication Directorate, and Chief Information Officer Linda Cureton; Proposal/Instrument Manager in the Instrument Systems Branch, Dr. Aprille Ericsson; and former Deputy Director-Technical, Dolly Perkins. The panel generously shared their education, career development stories, and tools for balancing family and work in today's environment with an audience of over 50 employees.

Photo Credit: Debora McCallum

Caption: Panel members Aprille Ericsson, Dorothy Perkins, Linda Cureton, and Nancy Abell.

Several times during the month, WAC hosted showings of "The Power Dead Even Rule," a video featuring Dr. Pat Heim. Dr. Heim describes, with a great deal of humor, the different approaches and assumptions men and women bring to everyday life and problem solving, and the results. The discussions between the men and women who attended the various events were lively, and more events are being planned.

In addition, on March 27, Rick Obenschain hosted a "Can We Talk" session to discuss issues of concern to women. Dr. Laurie Leshin and Nancy Abell, and over 25 employees attended the facilitated discussion. "The Power Dead Even Rule" and its implications were discussed. Rick made a commitment that the Management Council will see and discuss the video. The group also explored the continuing challenge women face in project management. While no final decisions were reached on this topic, the conversation moved forward and issue awareness continues.

Photo Credit: Bill Hrybyk

Caption: Ron Brade, Director of the Office of Human Capital Management (OHCM), and Dr. Shirley Malcom of the American Association for the Advancement of Science (AAAS) share their work experiences with the audience.

Fifty employees attended the "Strategic Negotiation for Women" workshop, offered in conjunction with ADR on March 20. In a highly interactive environment that provided a safe learning experience, Nina Meierding, M.S., J.D., helped the participants explore how gender affects communication and negotiation, and how language and power is exercised and understood. Class members used a variety of practice tools to enhance their skills.

Dr. Shirley Malcolm, who has a successful career as a scientist, and is currently Director of Education and Human Resources Programs for the AAAS, gave the keynote talk, "Have Your Cake and Eat It Too: Managing a Career and a Life." Based on her personal experience, institutional practices, and research, she offered the audience viable solutions for juggling the often competing demands of family and career. Some of these solutions included having a career plan, making sure to be visible and document achievements when it counts, and making sure you have a supportive partner. ■

Goddard Team to Begin NuSTAR Mirror Production this Fall

By Lori Keesey

It took astrophysicist Will Zhang about 10 years to fine-tune his technique to efficiently manufacture super-thin, curved mirrors needed to focus x-ray photons. His perseverance has paid off.

Zhang and his team have won a position on the Caltech-led *Nuclear Spectroscopic Telescopic Telescope ARray* (NuSTAR) mission to provide the telescope's more than 3,000 individual mirror segments. Production is expected to begin this fall, once the installation of 10 large ovens needed to produce the segments is complete.

Until just a few months ago, Zhang wasn't even on the NuSTAR team. Initially, Caltech had chosen Columbia University to produce the mirror segments. In 2006, NASA cancelled NuSTAR because of funding shortfalls. When it became obvious that the Agency needed the mission to bridge the gap between the 2009 launch of the *Wide-field Infrared Survey Explorer* and the 2013 launch of the *James Webb Space Telescope*, the Agency restarted NuSTAR in 2007. By then, Zhang had pulled ahead of Columbia in fine-tuning the production technique.

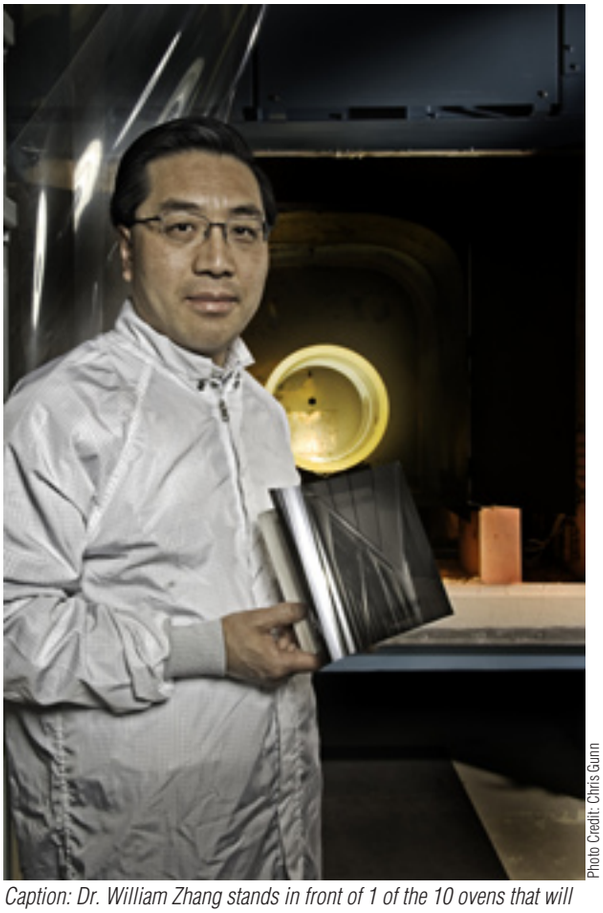

Photo Credit: Chris Gunn

Caption: Dr. William Zhang stands in front of 1 of the 10 ovens that will produce the mirror segments.

"There are two reasons why we pulled ahead," Zhang said. "Number one, we started out with the right idea; and two, we had more money and professionals than Columbia." Money and personnel were initially provided through Goddard's Director's Discretionary Fund (DDF) in 1998, and subsequently through the Internal Research and Development (IRAD) program in 2004–2007. Zhang's team also received support from the Constellation-X project.

"Without DDF and IRAD funding, our work would have taken much longer and we might have been beaten by the competition," Zhang said. "The R&D funding gave us time and money. It gave us encouragement and legitimacy. To get an idea like this going, you need both. Now, we're talking about flying this by 2011."

X-ray mirrors must be curved and nested inside an optical assembly so that the highly energetic x-ray photons graze their surface, instead of passing through them—much like a stone skimming the surface of a pond. To make these curved segments, Zhang will use flat sheets of smooth, lightweight glass measuring only 200 microns thick—the thickness of three sheets of paper.

His production team will place the commercially available glass on a mandrel, or rounded mold, that provides the exact optical prescription for NuSTAR's mirrors. Technicians will then place the entire assembly inside an oven that heats the glass to about 593° C (1,100° F). As the glass heats, it softens and folds over the mandrel to produce a curved mirror that is an accurate copy of the mandrel's surface.

In contrast, Columbia University "slumped" the glass into the mandrel, not over it, Zhang said. "Our approach is more controllable. Furthermore, we use a release layer that prevents the glass from sticking." This proprietary preparation technique preserves the mirror's surface quality. "Our yield is almost 100 percent," he said.

The NuSTAR production effort begins in October 2008. Once Goddard technicians finish the job in November 2009, they will ship the 3,120 pieces to the Danish Space Research Institute, which is responsible for coating the segments with 300 alternating layers of tungsten and silicon. From there, the coated mirror segments will be shipped back to Columbia University where they will be placed and aligned in a nested configuration inside two 10-meter-long assemblies to form the telescope's grazing-incidence optics.

Zhang is looking forward to applying his technique to other missions. "NuSTAR will be a precursor to Constellation-X," the proposed flagship x-ray mission that NASA hopes to fly in 2018 to answer the most compelling unsolved problems in astrophysics and cosmology. "This is really an opportunity for us to demonstrate that the technology is flight-worthy, and is ready for a bigger mission," Zhang said. "Producing NuSTAR's mirrors will let us show that we can mass-produce the segments."

"This will be a revolutionary mission," Zhang added. "It would have been a shame for Goddard to sit by and not be a part of it." ■

A Lunar Resting Place

By Kelsey Paquin

When Joe Vitale passed away from brain cancer on February 2, 2007, his family and friends knew that he would not soon be forgotten. His sense of humor, integrity, and heart left a permanent mark on those around him. Now, his Goddard family is remembering Joe by leaving a mark on his final project at NASA Goddard, the *Lunar Reconnaissance Orbiter* (LRO). They have engraved one of its reaction wheels in his honor.

Photo provided by the Vitale family

Caption: Joe Vitale.

Joe had been working as an engineer at NASA Goddard since 1993, most recently in Code 596, where he designed software used to support satellite missions. His last triumph at Goddard was the completion of the embedded flight software in the LRO reaction wheels. His efforts were critical to the successful design of the spacecraft, as the reaction wheels will be used to direct it and keep it at the desired position and orientation once it is launched.

Russ Roder, LRO's reaction wheel lead, explains, "Each reaction wheel has a flywheel. When the flywheel spins up in one direction, the spacecraft starts to spin very slowly in the opposite direction. If you put a few reaction wheels on a spacecraft, you can control pointing about all three axes."

When collecting information about the lunar environment on the level of detail that LRO will, such exacting control is all-important. This control would not be possible if not for the software Joe designed. Even though he's gone, Joe continues to be a part of LRO's success.

It seems appropriate to honor Joe, the self-dubbed "Gadget Man," through one of his own technological achievements. Miriam Wennersten, his long time co-worker and friend, says, "Joe was a man all about gadgets. He loved toys and games. He married his love of gadgets with his love of games. For his flight simulator games on the computer, he had the right joystick. For his driving games, he had the right steering wheel. When his wife would go out of town, he would go over to a friend's house, where they would "geek out" and play computer games all night long."

The list of people touched by Joe was not limited to those directly around him. Shortly after receiving the news that he had a brain tumor, Joe decided he would share his story by creating a Web site to chronicle his journey. Through it, he was able to meet and connect with people across the country. He constructed a virtual prayer network and placed pushpins on a map at every location where someone was known to be praying for him. About 200 pins crowded the map, displaying Joe's ability to reach even those he had never met face-to-face.

Joe's approach to his disease is described by Wennersten as, "Classic Joe Engineer." He faced it with the same problem-solving knack that he applied to his profession as an engineer. He did extensive research on his disease and kept track of the doctors he had seen and the questions he had asked of them. He tracked his medication dosages and changes, and kept lists of helpful books he had read. True to his desire to share his story, Joe made all of this available on his Web site.

Chuck Clagett, Joe's supervisor, said, "As Joe's friend, I always had the highest respect for him because of his honesty and bluntness in any situation. When he saw someone or something being done wrong, he would always get involved to straighten it out. He was not driven by political correctness, only by uncovering the truth. That's a rare quality in today's environment and one that I admire. His loss is still felt within the Branch and LRO project. We will forever be blessed for the time we had Joe with us."

Joe's wife, Debbie, and his children made a visit to Goddard in February to view the engraved reaction wheel. She expressed that she was pleased to see how LRO was progressing and that Joe would appreciate what the project office had done for him.

When LRO has run its course and served its purpose, it will be guided to a to-be-determined spot on the Moon. The result of the impact will be a plume of debris that other satellites and telescopes can observe to find out more about the Moon's composition. When the spacecraft reaches its final resting place, so will Joe's engraved reaction wheel. ■

Photo credit: NASA

Caption: Engraved LRO reaction wheel.

Meet the Faces at Goddard Behind GLAST: Dr. Julie McEnery

By Rob Gutro

Photo Credit: NASA

Caption: Dr. Julie McEnery.

NASA's *Gamma-ray Large Area Space Telescope* (GLAST) is scheduled to launch from Cape Canaveral later this summer. There are many people on the GLAST team, and one familiar face is that of Dr. Julie McEnery.

Julie is one of three Deputy Project Scientists on the GLAST mission. The others are Dr. Neil Gehrels and Dr. David Thompson, both also at NASA Goddard.

Since 2005, astrophysicist Julie McEnery has served as a Deputy Project Scientist for GLAST. She has also served as the Analysis Coordinator on the Large Area Telescope (LAT), GLAST's primary science instrument.

In the latter role, she coordinates the science activities within the LAT instrument team. She is involved in all LAT science topics, and coordinates team science activities such as low-level simulations, analysis development, and planning for first-year publications. As a Deputy Project Scientist, she provides scientific guidance and information to mission staff, working with all elements of the mission, from instrument teams to mission operations. These efforts will maximize scientific return from the observatory.

Julie has previously worked with ground-based gamma-ray telescopes, which detect Cherenkov radiation produced when gamma rays from deep space strike Earth's atmosphere. As a graduate student, she used the Whipple Observatory to make very-high-energy observations.

She also worked with the Megacity Initiative: Local and Global Research Observations (Milagro) collaboration, primarily on gamma-ray burst (GRB) observations. Active galaxies and GRBs remain her main science interests, but she also explores interesting topics in other areas.

In 1990, she was an observer at the United Kingdom's Schmidt Telescope at Siding Spring, Australia. Following that, Julie was a postgraduate scholar at University College in Dublin, Ireland; a Postdoctoral Research Associate at the University of Utah in Salt Lake City; and an Assistant Scientist at the University of Wisconsin in Madison. Before coming to NASA, she was a GLAST research scientist at the University of Maryland, Baltimore County.

She is a member of several organizations and instrument teams, including the American Physical Society, the American Astronomical Society, the Milagro Collaboration, and the VERITAS Collaboration.

A citizen of Ireland, Julie received her B.S. in physics, with a concentration in astrophysics, from the University of Manchester in June 1993. In August 1997, she received her Ph.D. in Physics from University College in Dublin.

On Saturday, May 3, 2008, you can meet Julie during the Space Day activities at the National Air and Space Museum on the National Mall in Washington, D.C. She'll be there to promote GLAST and educate the general public on gamma-rays and the extreme universe that GLAST will study. Be sure to stop by and learn about all the fascinating things she's working on!

For more information about GLAST, visit: http://www.nasa.gov/glast. For more information about Milagro, visit: http://geo.arc.nasa.gov/sgg/INTEX-B/index.html. ■

The Dynamic Engineers of SDO

By Kelsey Paquin

Milling around the clean rooms and cubicles, engineers in the *Solar Dynamics Observatory* (SDO) Project Office at NASA's Goddard Space Flight Center in Greenbelt, Md., have been hard at work building an observatory that will study the Sun. Mechanical engineers Danielle Vigneau-Grace and Andrea Mattern play an integral role in getting the observatory ready for its December 2008 launch.

They work with a team of engineers developing the instrument module for the SDO. SDO will look inside the Sun at the source of violent space weather that can disrupt satellites and power grids. The instrument module holds the observatory's three instruments and provides the interfaces each one needs for pointing and stability.

Danielle Vigneau-Grace

Outside of work, life is changing in big ways for Danielle Vigneau-Grace. She gave birth to her first child on September 6, 2007. "My daughter Erin is almost seven months [old] and she's absolutely wonderful," said Grace. "She's not a very good sleeper, so the mornings can be difficult, but she makes up for it with a great personality."

Additionally, Danielle is pursuing her Ph.D. in solid mechanics and material science at George Washington University, where she completed her master's degree in mechanical engineering in 1997. Born and raised in Centerline, Mich., she attended the University of Michigan, Dearborn, for her bachelor's degree in mechanical engineering, though she frequently traveled to the main campus in Ann Arbor for football games.

Having been at Goddard since 1991, Danielle is looking forward to seeing her first launch. In 2004, she traveled to the Cape Canaveral Air Force Station in Florida for the launch of the *Swift* satellite, but she had to miss it when it was delayed three days. Her flight home and *Swift*'s flight into orbit lifted off on the same morning. This time around, she hopes to see SDO off.

As a full-time engineer, new mother, and Ph.D. student, Danielle's limited free time is often spent as a dedicated sports enthusiast. Raised in an athletic family, she attended her first college football game at the ripe old age of three months. Since then, she has enjoyed watching football, baseball, and basketball regularly. Her loyalties lie mainly with the Detroit Red Wings ice hockey team. In addition to watching sports, she loves playing them—ice hockey and snowboarding in particular.

Andrea Mattern

Andrea Mattern was born and raised in Bismarck, N.D. The clear skies allow for beautiful views of the stars. Looking up at the big night sky sparked Andrea's fascination with space. As an undergraduate at the University of North Dakota, she was not sure what she wanted to study until her father suggested engineering. Her affinity for math and science, as well as her interest in space, led her to a Bachelor of Science in mechanical engineering with a concentration in aerospace and a minor in space studies.

Andrea says her interest in NASA started when she was still a student. She thought that working at NASA would be a perfect fit, so she began looking for a co-op position. Andrea sent her resume to Centers across the country, including Goddard. She started on the *Swift* project in 2001. When she graduated in December 2003, she started working full-time at Goddard and has been here ever since.

Andrea says that when she is not at work, she enjoys visiting her 11-month-old niece as much as possible and staying active in her church. Helping others is something she feels is a very important part of life, so she volunteers when she can by working in soup kitchens and for Habitat for Humanity. She hopes to work on her first house for Habitat for Humanity this summer. She also enjoys rollerblading and volleyball. She learned to sail when she was a member of Goddard's sailing club 2005. As a part of her aerospace concentration in college, Andrea got her private pilot's license. When she worked as a counselor at Space Camp, she became a certified scuba diver.

Although she has not been able to indulge her flying and scuba hobbies as often as she would like since moving to the D.C. area, Andrea says, "It is so easy to get wrapped up in day-to-day events that sometimes we forget there is more to life," said Mattern. "To keep things interesting, I try to do something new every year." ■

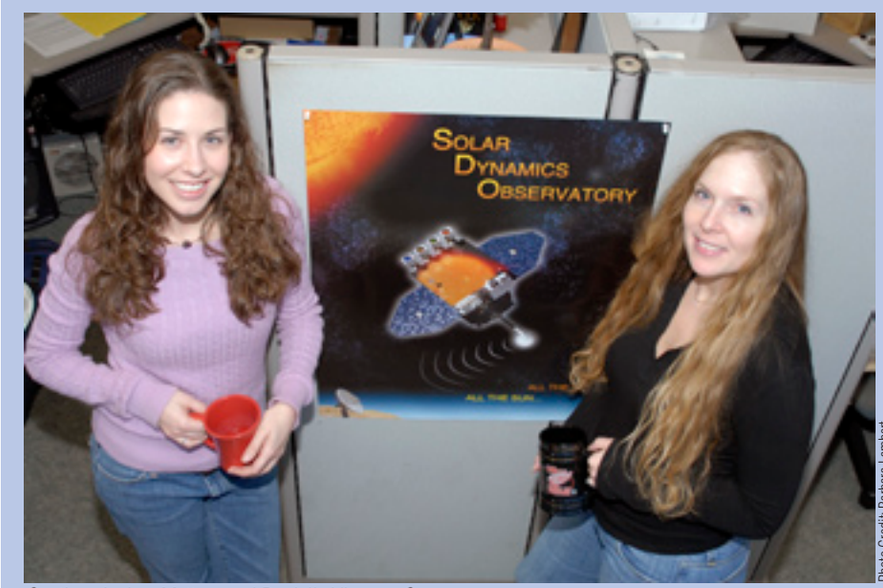

Photo Credit: Barbara Lambert

Caption: Andrea Mattern and Danielle Vigneau-Grace.

Scientist's Extraordinary Work with Extrasolar Planets

Drake Deming

By Nancy Neal-Jones

Photo credit: Pat Izzo

Caption: Drake Deming.

Goddard's Drake Deming received the John C. Lindsay Award in 2007 for his detection of light from extrasolar planets. Extrasolar planets are planets that orbit other stars. His discovery has led to a whole new area of research and discovery.

In 2000, a group from the United Kingdom claimed to have detected light from a close planet. After hearing about this discovery, Deming considered how to detect these objects in the infrared wavelength. He and his colleague, Jeremy Richardson, were unable to do it using ground-based observatories. When the *Spitzer Space Telescope* launched, they realized that *Spitzer* provided the perfect means to measure these planets in the infrared wavelength.

During 2004–2005, David Charbonneau from the Harvard Smithsonian Center for Astrophysics was also looking at such planets, and he already had agreed-upon observing time using the *Spitzer* Infrared Array Camera (IRAC) instrument. *Spitzer* had strict rules for using the same instrument to look at the same object. This meant that Deming and his team had to propose observing time using a different instrument. They chose the Multi-Band Imaging Photometer for *Spitzer* (MIPS) to observe the brightest transiting planet. Both teams saw the planet emission with two separate instruments. Coincidently, on the same day, both teams submitted papers to two different journals. Deming and Charbonneau were the first to discover first light from other worlds. This discovery became one of the biggest science stories of 2005.

To make the measurement, Deming used a new technique to observe extrasolar planets that cross the faces of their host stars. He observed the planet and star together, then subtracted the light taken when the planet passes behind the star and is hidden from view. Astronomers are then able to measure the temperature of the planet and gather information about its atmosphere.

One year later, Deming observed another planet with a strong heat emission signal. This legitimized the original detections back in 2005. As Deming put it, "We were quite confident in the original detections, as I think most people were, but if there were any skeptics left, then this second paper did them in."

According to Deming, the 2006 detection was, "The closest extrasolar planet to Earth that has ever been detected directly, and it presents the strongest heat emission from an exoplanet. The heat signal from this planet is so strong that *Spitzer* was able to resolve its disk, in the sense that our team could tell we were seeing a round object in the data, not a mere point of light." Subsequent observations by Charbonneau and his students have expanded on Deming's initial observations to make a longitudinal temperature map of this world. Deming and Charbonneau won the NASA Exceptional Scientific Achievement Award in 2006 for their discovery.

In addition to his work on *Spitzer*, Deming is the Deputy Principal Investigator for the Deep Impact extended mission, EPOXI. EPOXI is a combination of two separate science investigations. The investigations consist of the Extrasolar Planet Observations and Characterization (EPOCh), and the flyby of comet Hartley 2, called the Deep Impact eXtended Investigation (DIXI). Deming is the Principal Investigator on the EPOCh investigations. EPOCh observations began in January 2008.

"We're on the hunt for planets down to the size of Earth, orbiting some of our closest neighboring stars," said Deming. Currently, Deming and his team are in the process of analyzing new EPOXi data.

The Lindsay Award commemorates the 1962 launch of the first of eight Orbiting Solar Observatories, which was built by John C. Lindsay and others. ■